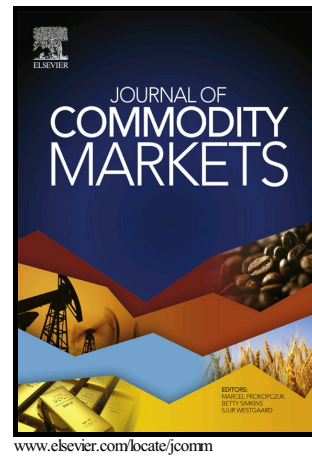


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# Heterogeneous Traders, Liquidity, and Volatility in Crude Oil Futures Market

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January 19, 2017

## Abstract

We are the first to analyze the relation between liquidity, volatility, and return distributions for the crude oil futures market. We do this by using a quantile regression method while most of the research in the field of liquidity and volatility has employed conventional OLS regression. While the latter approach can be useful in many applications, they fail to provide any insight about the effects in the rest of the distributions - outside the mean - of interest. Our results show that a distinct volatility “smile” is formed when trading activity, measured by the number of unique trades, increases. In contrast, an increase in trade size decreases volatility significantly, especially at the tails, resulting in an inverse “smile” or a “frown”. Similar results are obtained for the relation between the liquidity measures and the return distribution. We explain our results by trading behavior of heterogeneous traders and suggest directions for future theoretical and empirical research within this field.

**Keywords:** Realized Volatility, Liquidity, Trading Volume, Energy Markets, Crude Oil.

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